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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,103	03/12/2001	Akira Tamatani	204194US0	6450

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EXAMINER

DI GRAZIO, JEANNE A

ART UNIT PAPER NUMBER

2871

DATE MAILED: 10/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/803,103

Applicant(s)

TAMATANI ET AL.

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 12 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Priority

Applicant claims foreign priority to Japanese Patent Application No. 2000-102738, April 4, 2000.

Drawings

Examiner Note: Figure 5 and the graph thereof should include appropriate units for time and internal pressure.

Specification

Please note grammatical and or spelling corrections to the specification.

Claim Objections

Claims 1,5,7,9 and 10 are objected to because of the following informalities. Per claims 1, 5, 7, and 10: insert a “:” after the transitional phrase “comprising.” Per claim 5 (line 1): “claims” should be singular. Per claim 7: (line 1) insert “a” between “manufacturing” and “liquid”, (line 4) “expect” should read “except”, (line 9) insert “the” between “to” and “surfaces.” Per claim 9 (line 3): insert “the” between “to” and “surfaces.” Per claim 10 (line 4): “expect” should read “except.” Per claim 10 (line 8): please correct “seal agent” to “sealing material.” Appropriate correction is required. Examiner Comment: Applicant might want to consider changing “area occupying rate” to “area occupying ratio” because the ‘area occupying rate’ is actually a ratio.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. (USPN 5,978,061).

Per claims 1-4: A sealing material provided on a periphery of a substrate for preventing leakage of liquid crystal, projections formed by etching a film formed on the substrate, and another substrate opposing the substrate being remote therefrom by a gap and being supported by the projections, wherein an area occupying rate of the projections with respect to a region enclosed by the sealing material is not less than 0.0001 and not more than 0.003.

- The area occupying rate:
 - is not less than 0.001 and not more than 0.002.
 - is not less than 0.001 and not more than 0.0015.
- The film is formed of an acrylic resin.

Sealing material provided on a periphery of a substrate for preventing leakage of liquid crystal, projections / spacers formed by etching, and another opposing substrate at a given gap and supported by projections, are elements common in the art of liquid crystal technology.

Miyazaki et al. furthermore discloses that the distribution density of spacers (projections) should exceed 0.00002 square millimeters but be less than 0.005 square millimeters [Col. 19, Lines 49-50]. It would have been obvious at the time the invention was made to have ranges of 0.0001 to 0.003, 0.001 to 0.002, and 0.001 to 0.0015 because on-substrate distribution density of spacers (projections) is a key factor for accurately controlling substrate distances [Col. 19, Lines 42-44]. In addition to which, if under 0.0001 mechanical strength of the spacers (projections) may be impaired. If over 0.003, low-temperature bubbling may occur when the liquid crystal device is at a low temperature.

Acrylic resins are commonly used in the art of liquid crystal technology.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi (USPN 6,067,144).

Per claims 5 and 6: A sealing material provided on a periphery of a substrate for preventing leakage of liquid crystal, projections formed by etching a film formed on the

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substrate, and another substrate opposing the substrate being remote therefrom by a gap and being supported by the projections, wherein heights of columnar spacers are varied.

Murouchi discloses spacers of varying heights. With respect to the Murouchi invention, spacer height varies in order to obtain a satisfactory strength of the cell and to obtain a sufficient "sucked width of [an] end seal [Col. 2]."

- The heights are different by not less than 0.05 μ m.

Murouchi does not disclose heights varying by not more than 0.05 μ m; however, it is well known in the art that it is generally desired to have substrate-substrate distance as uniform as possible and thus to have spacer height as uniform as possible for cell strength and for maximum display quality.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajita et al. (USPN 6,275,280 B1).

Per claims 7-9 (method claims): The method claims describe the steps of forming projections by etching a film formed on a substrate, applying a sealing material on a periphery of the substrate in an annular form expect for an injection inlet for liquid crystal, overlapping another substrate onto the substrate with the projections and the sealing material being interposed therebetween, injecting liquid crystal through the liquid crystal injection inlet into a region enclosed by the sealing material, and applying a pressure of not less than 1,000 Pa and not more than 40,000 Pa to the surfaces of both substrates.

- A pressure of not less than 1,000 Pa and not more than 20,000 Pa is applied onto the surfaces of the substrates.
- A sealing agent is applied to the liquid crystal injection inlet simultaneously with applying pressure to the surfaces of both substrates.

The steps of forming projections via etching, applying a sealing material around the border of a substrate leaving an inlet wherein liquid crystal is injected, overlapping substrates with liquid crystal between the substrates, injecting liquid crystal through the inlet into a region

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enclosed by the sealing material, and applying pressure to the substrates are common method steps in the art of liquid crystal technology.

Kajita et al. discloses that a pressure of about 10,000 to 100,000 Pa is commonly applied to substrates [Col. 3, Lines 59-61]. It would have been obvious at the time the invention was made to vary pressure applied to the substrates within the ranges of 1,000 to 40,000 or 1,000 to 20,000 Pa depending on the proportion of non-display regions within the screen of a liquid crystal display.

Spacer density affects the distribution of injected liquid crystal material; thus, the more even the spacer distribution, the more even the flow of the injected liquid crystal. The more even the flow of liquid crystal, the less likely the presence of extraneous liquid crystal matter that is extruded upon compression of the substrates. It would have been obvious, at the time the invention was made, to seal the injection inlet simultaneously with the application of pressure to the substrates because of an even spacer distribution.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyake (USPN 6,118,509).

Per claim 10: The method claims describe the steps of forming projections by etching a film formed on a substrate, applying a sealing material on a periphery of the substrate in an annular form expect for an injection inlet for liquid crystal, overlapping another substrate onto the substrate with the projections and the sealing material being interposed therebetween, injecting liquid crystal through the liquid crystal injection inlet into a region enclosed by the seal agent, and applying a sealing agent to the injection inlet of the liquid crystal display device after elapse of a specified time from completion of injecting liquid crystal.

Miyake discloses that the dispersion of uncured sealing material at an injection port into the liquid crystal can be prevented by the application of UV light or radiation onto the injection port. It would have been obvious at the time the invention was made, in light of Miyake, to seal the injection inlet after a specified time from completion of injecting the liquid crystal to make sure that no uncured seal agent contaminated the liquid crystal.

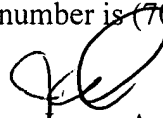
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703)308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio



James A. Dudek, Primary Examiner

JDG

September 28, 2002